

PERFORMANCE REPORT

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FEDERAL AID PROJECT F-221-M-5

INLAND FISHERIES DIVISION MONITORING AND MANAGEMENT PROGRAM

2014 Fisheries Management Survey Report

Mineral Wells Reservoir

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SURVEY AND MANAGEMENT SUMMARY

Fish populations in Mineral Wells Reservoir were surveyed in 2014 using electrofishing and trap netting. Habitat, vegetation, and angler access were surveyed in 2014. This report summarizes the results of the surveys and contains a management plan for the reservoir based on those findings.

- **Reservoir description:** Mineral Wells Reservoir, a 440-acre impoundment located on Rock Creek in Parker County, was constructed in 1920 by the U.S. Army and is situated at the east edge of Mineral Wells. Since 2012 water level has declined from conservation elevation (863 feet above mean sea level) until late April 2015, when the lake flowed over the spillway. Mineral Wells Reservoir has moderate primary productivity. Habitat features consisted mainly of rocky shoreline and native emergent vegetation, especially along the shoreline.
- **Management history:** Important sport fish include Channel Catfish, Largemouth Bass, and White Crappie. As part of the 2010 management plan, a catch-card creel survey was conducted in 2012 to determine angler harvest information. Stocking of advanced fingerling Channel Catfish was discontinued after the creel survey, which indicated the current Channel Catfish population could sustain the present angling pressure.
- **Fish community**
 - **Prey species:** Electrofishing catch rate of Gizzard Shad was the highest since 1992 with an abundance of fish seven inches and smaller. The electrofishing catch rate of Threadfin Shad was the highest on record. Electrofishing catch rate of Bluegill was below average but the population still consisted mostly fish ≤ 4 inches. The prey base for Mineral Wells Reservoir in 2014 was once again robust.
 - **Channel Catfish:** Not sampled in 2015 due to unsuitable water quality conditions.
 - **Largemouth Bass:** The electrofishing catch rate of Largemouth Bass was lower than the reservoir average, but size structure was good with bass up to 23 inches in the sample. Growth rates have decreased but body condition was still good.
 - **White Crappie:** Trap net catch rate of White Crappie was similar to 2010. However, most were young-of-the-year. Only 12.5% of the sample was legal size. The fish were in excellent condition.
- **Management strategies:** Conduct standard monitoring with electrofishing, trap netting, and gill netting in 2018-2019. Install fish attractors around fishing piers. Communicate fishing information on TPWD website and district Facebook page. Inform the Lake Mineral Wells State Park personnel about new exotic species threats to Texas waters, and work with them to display appropriate signage, educate constituents, and understand appropriate enforcement actions.

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INTRODUCTION

This document is a summary of fisheries data collected from Mineral Wells Reservoir in 2014-2015. The purpose of the document is to provide fisheries information and make management recommendations to protect and improve the sport fishery. While information on other species of fishes was collected, this report deals primarily with major sport fishes and important prey species. Historical data are presented with the 2014-2015 data for comparison.

Reservoir Description

Mineral Wells Reservoir is a 440-acre impoundment constructed in 1920 on Rock Creek in Parker County. It was constructed by the U.S. Army and is located at the east edge of Mineral Wells. Historically, it was used as a water supply and recreation area for the Fort Wolters Army Base. Currently, it is located within the boundaries of Lake Mineral Wells State Park and is used for recreation and emergency water supply for the City of Mineral Wells. Chl-a measurements were not available for Mineral Wells Reservoir, however average Secchi disk transparency was 40 cm for 2014 and suggested eutrophic conditions as per Carlson's Trophic State Index (Texas Commission on Environmental Quality 2011). Habitat at time of sampling consisted of rocks and boulders and natural shoreline. Water level remained within one foot of conservation elevation (863 feet above mean sea level) from May 2011 to January 2012. The water level then declined continually until mid-April 2015 to 8 feet below conservation level. In late April 2015, the reservoir filled to conservation level and flowed over the spillway (Figure 1). Other descriptive characteristics for Mineral Wells Reservoir are in Table 1.

Angler Access

Boat access consisted of one public boat ramp with parking and boarding pier. Additional boat ramp characteristics are in Table 2. Anglers can fish off 5 piers adjacent to various campgrounds. A larger T-shaped pier is available near the concession building. Further information about Mineral Wells Reservoir and its facilities can be obtained by visiting the Texas Parks and Wildlife Department (TPWD) web site at www.tpwd.state.tx.us and navigating within the fishing web page.

Management History

Previous management strategies and actions: Management strategies and actions from the previous survey report (Moczygemba and Hysmith 2011) included:

1. Angler harvest information is unknown for this state park reservoir.
Action: A catch-card creel survey was conducted in 2012. Results indicated crappie were the most sought-after fish with Channel Catfish as the fourth most sought-after. Channel Catfish provided 8% of the total harvest (Moczygemba In press). There were some visitors that came to the park for fishing because of the license-exempt fishing offer.
2. The Channel Catfish fishery cannot maintain a viable fishery without stocking advanced fingerlings.
Action: Annual stockings of advanced size fingerlings continued through 2011. Due to the results of the catch-card survey, the Channel Catfish fishery was considered minimal. The current Channel Catfish population can sustain the fishery. The stocking of advanced fingerlings was discontinued.
3. Cooperate with Lake Mineral Wells State Park personnel to post appropriate signage on invasive species, especially zebra mussels, at access points around the reservoir. Educate State Park personnel on other invasive species.
Action: Personnel with the Lake Mineral Wells State Park were educated on invasive species, installed appropriate zebra mussel signage, and a zebra mussel sampler.

Harvest regulation history: With the exception of Channel and Blue Catfish, sport fishes in Mineral Wells Reservoir are currently managed with statewide regulations (Table 3). Channel and Blue Catfish are managed under Community Fishing Lake rules which include no minimum length limit and a 5 fish daily bag limit. Fishing is by pole and line only, with only two poles allowed per angler.

Stocking history: Mineral Wells Reservoir was last stocked in 2012 with ShareLunker and Florida Largemouth Bass adults. The complete stocking history is in Table 4.

Vegetation/habitat history: Rocky shoreline provides the most fishery habitat in Mineral Wells Reservoir (Table 5; Moczygemba and Hysmith 2011). Mineral Wells Reservoir supported native emergent aquatic vegetation (Table 6). Historically, water willow was abundant along most of the shoreline.

Water transfer: The City of Mineral Wells has water rights to Mineral Wells Reservoir and an operational pump in the lake. However, the City of Mineral Wells only exercises the water rights as a contingency during high drought conditions or emergency water demands. The City has not exercised their right in recent history.

METHODS

Fishes were collected by electrofishing (1 hour at 12 5-min stations) and trap netting (5 net nights at 5 stations). Catch per unit effort (CPUE) for electrofishing was recorded as the number of fish caught per hour (fish/h) of actual electrofishing and, for trap nets, as the number of fish caught per net night (fish/nn).

All survey sites were randomly selected and all surveys were conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

A structural habitat survey was conducted in 2014. Vegetation surveys were conducted in 2002, 2005, 2010, and 2014 to monitor aquatic vegetation. Habitat was assessed with a modified digital shapefile method (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

Sampling statistics (CPUE for various length categories), structural indices [Proportional Size Distribution (PSD), as defined by Guy et al. (2007)], and condition indices [relative weights (W_i)] were calculated for target fishes according to Anderson and Neumann (1996). Index of vulnerability (IOV) was calculated for Gizzard Shad (DiCenzo et al. 1996). Relative standard error ($RSE = 100 \times SE$ of the estimate/estimate) was calculated for all CPUE statistics and SE was calculated for structural indices and IOV. Ages were determined using Category 2 protocol with otoliths from Largemouth Bass according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014).

Genetic analysis of Largemouth Bass was conducted according to the Fishery Assessment Procedures (TPWD, Inland Fisheries Division, unpublished manual revised 2014). Micro-satellite DNA analysis was used to determine genetic composition of individual fish from 2005 through 2014 and by electrophoresis for previous years.

Source for water level data was the United States Geological Survey (USGS 2015).

RESULTS AND DISCUSSION

Habitat: Littoral zone structural habitat consisted primarily of rocks and boulders (Table 5). Due to low water levels much of the reservoir bottom was exposed with little terrestrial vegetation growth. The once abundant water willow was limited to a few shoreline areas in the upper end. There was less than an acre of water willow present (Table 6). The spring 2015 increases in water level could allow the water willow to expand.

Prey species: Total electrofishing catch rates of Gizzard Shad and Bluegill were 202.0/h and 106.0/h, respectively. Index of vulnerability (IOV) for Gizzard Shad was 77, which was the highest in the past three

surveys (Figure 2). Total CPUE of Gizzard Shad was the highest since 1992 (Appendix C). Also, the Threadfin Shad CPUE of 2657.0/h was the highest on record (Appendix C). As in 2010, the size structure of Bluegill in 2014 was dominated by individuals in the 4-inch class (Figure 3). The prey base for Mineral Wells Reservoir in 2014 was in good shape.

Channel Catfish: Due to heavy rains in May 2015, the reservoir came up quickly. This caused high turbidity and low dissolved oxygen conditions in the reservoir and sampling was not conducted.

Largemouth Bass: Total CPUE (65.0/h) was much lower than the average of 114.3/h for the seven surveys since 1992 (Appendix C). However the size structure increased from a PSD of 46 in 2010 to a PSD of 71 in 2014 with bass up to 23 inches in the sample (Figure 4). On average, Largemouth Bass growth was slow; Largemouth Bass do not reach the legal length of 14 inches by four years ($N = 13$; range = 2 – 4 years; Figure 5). Body condition in 2014 was above 90 for most inch groups (Figure 4). Florida Largemouth Bass influence has remained relatively constant as Florida alleles have ranged from 26 to 38% since 2002, but no Florida genotypes have been collected since 2002 (Table 7). All Largemouth Bass collected in 2014 were intergrades.

White Crappie: The total trap net catch rate of White Crappie was 24.0/nn in 2014 (Figure 6), similar to the 2010 survey and above the average of 20.8/nn for surveys since 1992. The PSD was 72, but only 12.5% of the sample population was legal length (≥ 10 inches). The sample was dominated by young-of-the-year White Crappie with recruitment to legal size evident. Mean relative weights indicated White Crappie are in excellent shape with all inch groups approaching 100.

Fisheries management plan for Mineral Wells Reservoir, Texas

Prepared – July 2015.

ISSUE 1: The five fishing piers located near camp grounds and the large T-head fishing pier near the concession provide access to fishing for park visitors. Concentration of fish around these structures would give anglers a better chance of catching fish. The habitat around the piers could be enhanced to attract fish.

MANAGEMENT STRATEGY

Install fish attractors (brush piles or artificial) around the five fishing piers adjacent to park campgrounds and the one T-shaped fishing pier near the concession building.

ISSUE 2: Increasing societal demands on people's time are creating a competitive atmosphere in how a person's time is spent. TPWD is a brand name which supports and promotes fishing, among other exploits, and should always be on the forefront of advertising quality fishing and fishing opportunities.

MANAGEMENT STRATEGY

Through the use of the TPWD website and the Denison District Facebook page, communicate to the public unique and exceptional information about Denison District fisheries in order to promote fishing.

ISSUE 3: Many invasive species threaten aquatic habitats and organisms in Texas and can adversely affect the state ecologically, environmentally, and economically. For example, zebra mussels (*Dreissena polymorpha*) can multiply rapidly and attach themselves to any available hard structure, restricting water flow in pipes, fouling swimming beaches and plugging engine cooling systems. Giant Salvinia (*Salvinia molesta*) and other invasive vegetation species can form dense mats, interfering with recreational activities like fishing, boating, skiing and swimming. The financial costs of controlling and/or eradicating these types of invasive species are significant. Additionally, the potential for invasive species to spread to other river drainages and reservoirs via watercraft and other means is a serious threat to all public waters of the state.

MANAGEMENT STRATEGIES

1. Cooperate with Lake Mineral Wells State Park personnel to post appropriate signage at access points around the reservoir.
2. Contact and educate park personnel about invasive species, and provide them with posters, literature, etc... so that they can in turn educate their park visitors.
3. Educate the public about invasive species through the use of media and the internet.
4. Make a speaking point about invasive species when presenting to constituent and user groups.
5. Keep track of (i.e., map) existing and future inter-basin water transfers to facilitate potential invasive species responses.

SAMPLING SCHEDULE JUSTIFICATION:

The proposed sampling schedule consists of standard monitoring in 2018-2019 (Table 8).

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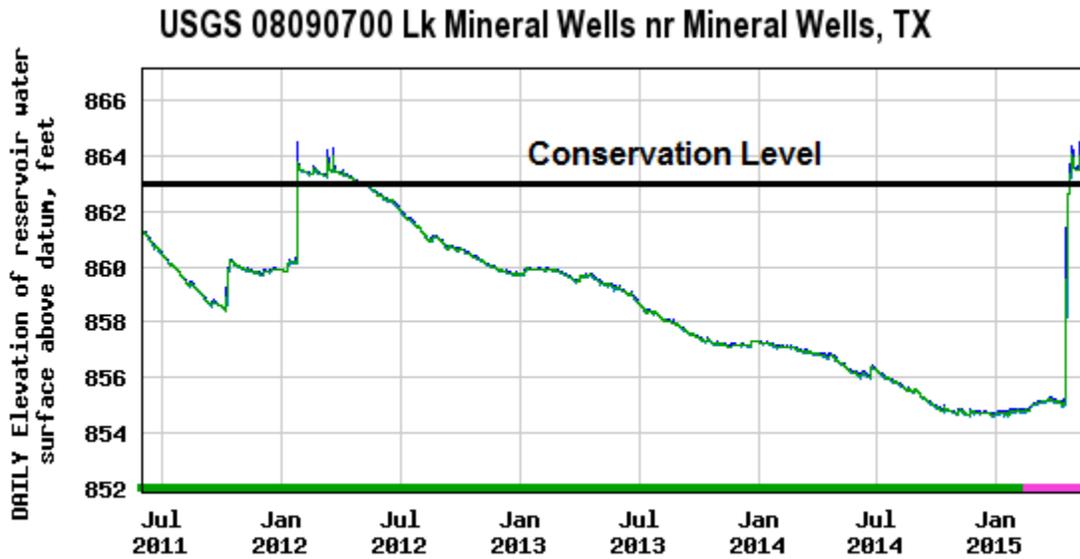


Figure 1. USGS real time water data for USGS 07315950 Mineral Wells Reservoir near Mineral Wells, Texas. <http://waterdata.usgs.gov/nwis/dv>, Texas, June 2011-May, 2015.

Table 1. Characteristics of Mineral Wells Reservoir, Texas.

Characteristic	Description
Year constructed	1920
Controlling authority	Palo Pinto Co Municipal Water District No. 1
Counties	Parker
Reservoir type	Offstream
Shoreline development index	1.9
Conductivity	266 μ mhos/cm

Table 2. Boat ramp characteristics for Mineral Wells Reservoir, Texas, August, 2014. Reservoir elevation at time of survey was 855.7 feet above mean sea level. Low lake levels prevented measurement of boat ramp elevation at time of survey.

Boat ramp	Latitude Longitude (dd)	Public	Parking capacity (N)	Elevation at end of boat ramp (ft)	Condition
South Ramp	32.81466 -98.03900	Y	16	unknown	Ramp out of water. Extension is feasible.

Table 3. Harvest regulations for Mineral Wells Reservoir, Texas.

Species	Bag limit	Length limit
Catfish: Channel and Blue Catfish, their hybrids and subspecies	5 (in any combination)	None
Catfish, Flathead	5	18-inch minimum
Bass, Largemouth	5 ^a	14-inch minimum
Bass, Spotted	5 ^a	None
Crappie: White and Black Crappie, their hybrids and subspecies	25 (in any combination)	10-inch minimum

^a Daily bag for Largemouth Bass and Spotted Bass = 5 fish in any combination.

Table 4. Stocking history of Mineral Wells Reservoir, Texas. Life stages are fry (FRY), fingerlings (FGL), advanced fingerlings (AFGL), adults (ADL) and unknown (UNK). Life stages for each species are defined as having a mean length that falls within the given length range. For each year and life stage the species mean total length (Mean TL; in) is given. For years where there were multiple stocking events for a particular species and life stage the mean TL is an average for all stocking events combined.

Species	Year	Number	Life Stage	Mean TL (in)
Blue Catfish	1988	<u>12</u>	ADL	15.8
	Total	12		
Channel Catfish	1971	15,000	AFGL	7.9
	1972	100,000	AFGL	7.9
	1987	32,800	FGL	3.0
	1989	18,786	AFGL	4.7
	1991	9,985	AFGL	5.2
	1992	9,948	AFGL	5.1
	1993	16,580	AFGL	8.8
	1993	11,040	FRY	0.4
	1994	35,638	AFGL	6.7
	1995	17,064	AFGL	7.2
	1996	16,575	AFGL	6.8
	2005	11,210	AFGL	10.0
	2008	11,095	AFGL	9.3
	2009	11,760	AFGL	9.0
	2010	11,163	AFGL	9.4
	2011	<u>11,034</u>	AFGL	9.1
Total	339,678			
Florida Largemouth Bass	1986	32,794	FRY	1.0
	1987	5,065	FGL	3.0
	1990	66,443	FRY	1.0
	1997	66,300	FGL	1.7
	2005	1,421	ADL	8.4
	2012	<u>73</u>	ADL	18.0
Total	172,096			

Table 4. Stocking History Continued.

Species	Year	Number	Life Stage	Mean TL (in)
Largemouth Bass	1967	60,000	UNK	UNK
	1972	<u>80,000</u>	UNK	UNK
	Total	140,000		
Rainbow Trout	1984	11,243	ADL	9.3
	1985	<u>17,943</u>	ADL	9.3
	Total	29,186		
ShareLunker Largemouth Bass	2012	<u>5</u>	ADL	17.2
	Total	5		
Threadfin Shad	1984	800	AFGL	3.0
	1985	<u>3,400</u>	AFGL	3.0
	Total	4,200		

Table 5. Survey of structural habitat types, Mineral Wells Reservoir, Texas, 2014. Shoreline habitat type units are in miles and piers and docks are in acres.

Habitat type	Estimate	% of total
Bulkhead	0.2 miles	2.9
Piers and docks	<0.1 acres	<0.1
Natural	1.0 miles	14.3
Rocky	5.8 miles	82.8

Table 6. Survey of aquatic vegetation, Mineral Wells Reservoir, Texas, 2002 – 2014. Surface area (acres) is listed with percent of total reservoir surface area in parentheses.

Vegetation	2002	2006	2010	2014
Native emergent	8.1 (1.8)	8.1 (1.8)	8.1 (1.8)	0.15 (<0.1)

12
Gizzard Shad

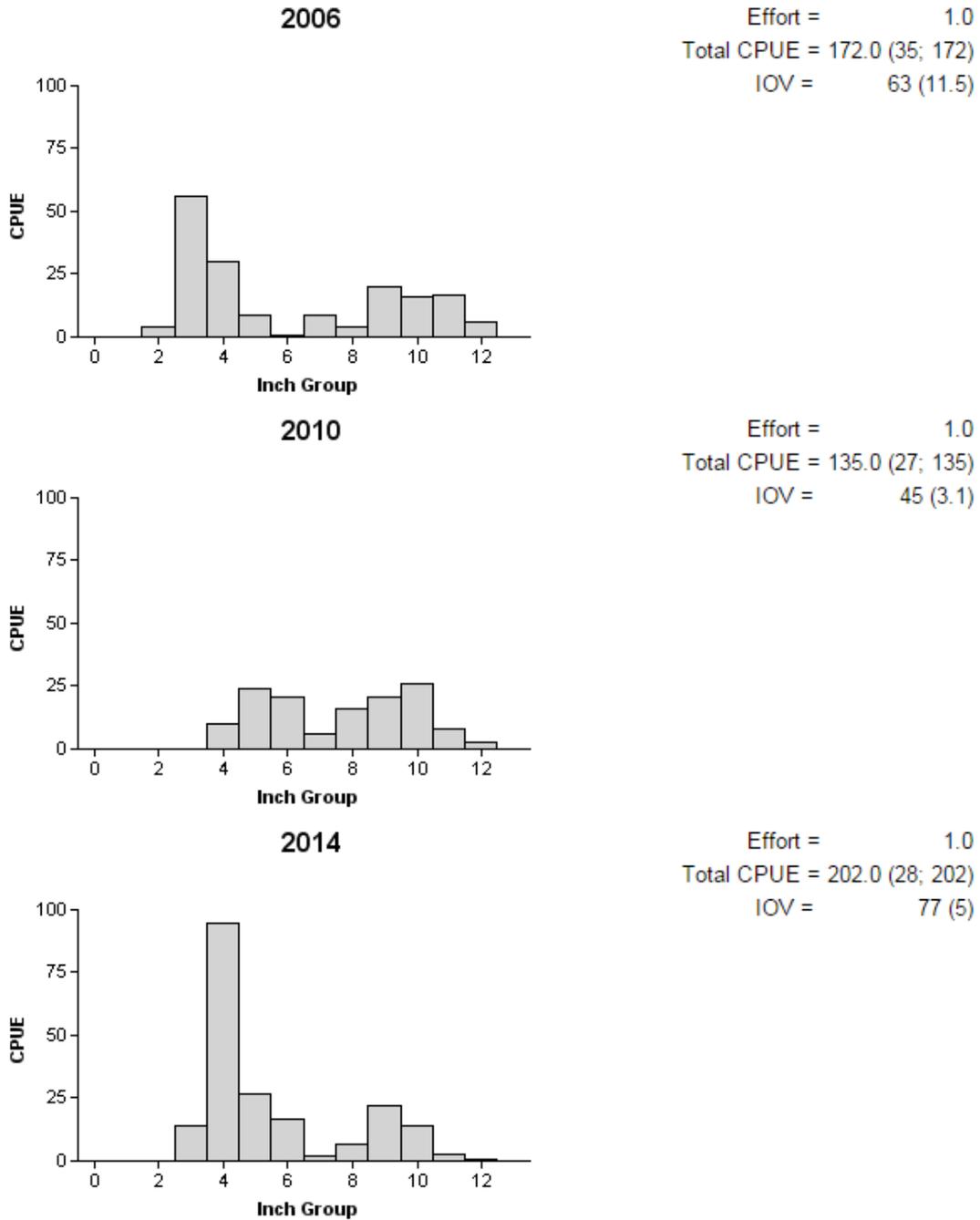


Figure 2. Number of Gizzard Shad caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for IOV are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas, 2006, 2010, and 2014.

13
Bluegill

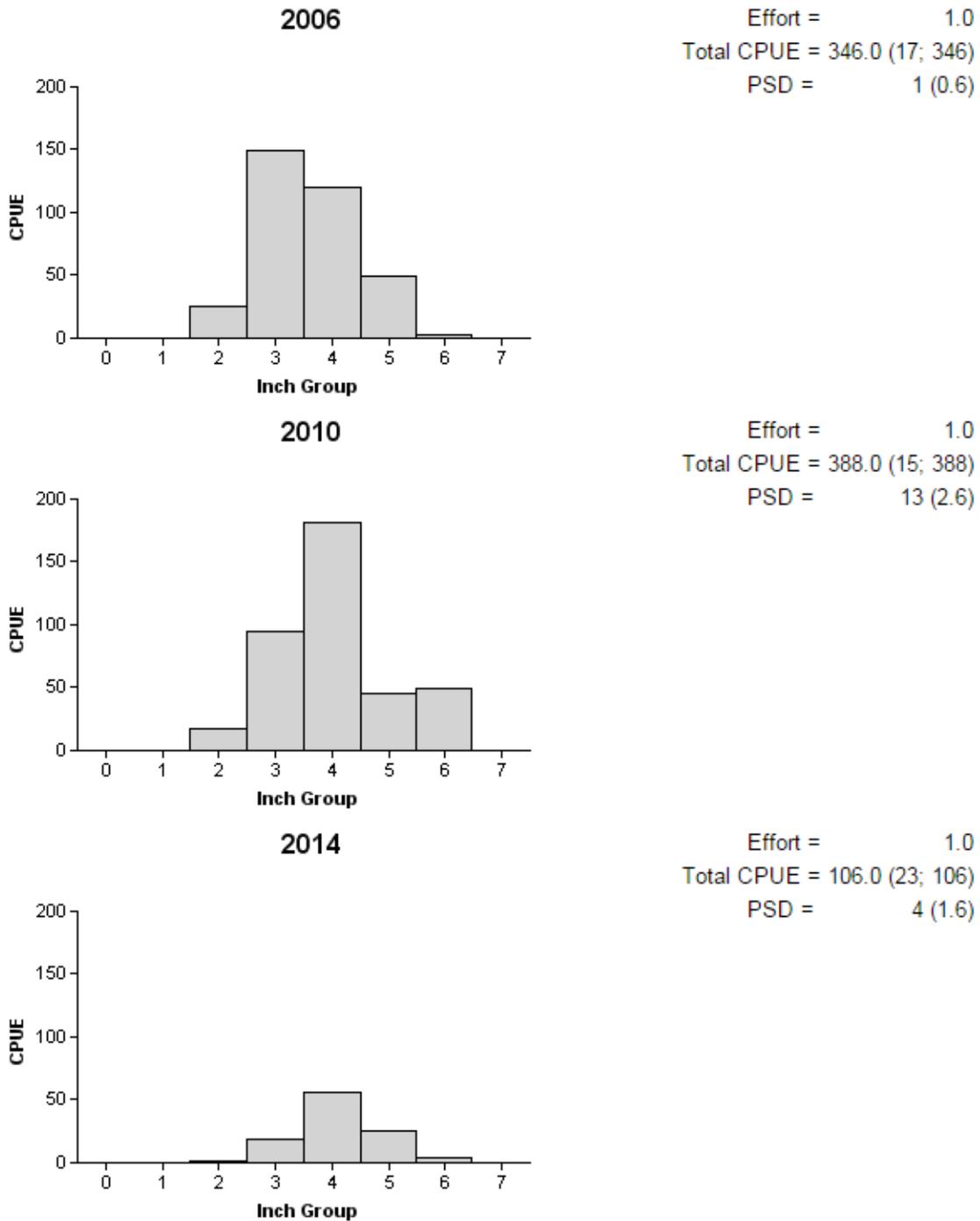


Figure 3. Number of Bluegill caught per hour (CPUE) and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas, 2006, 2010, and 2014.

Largemouth Bass

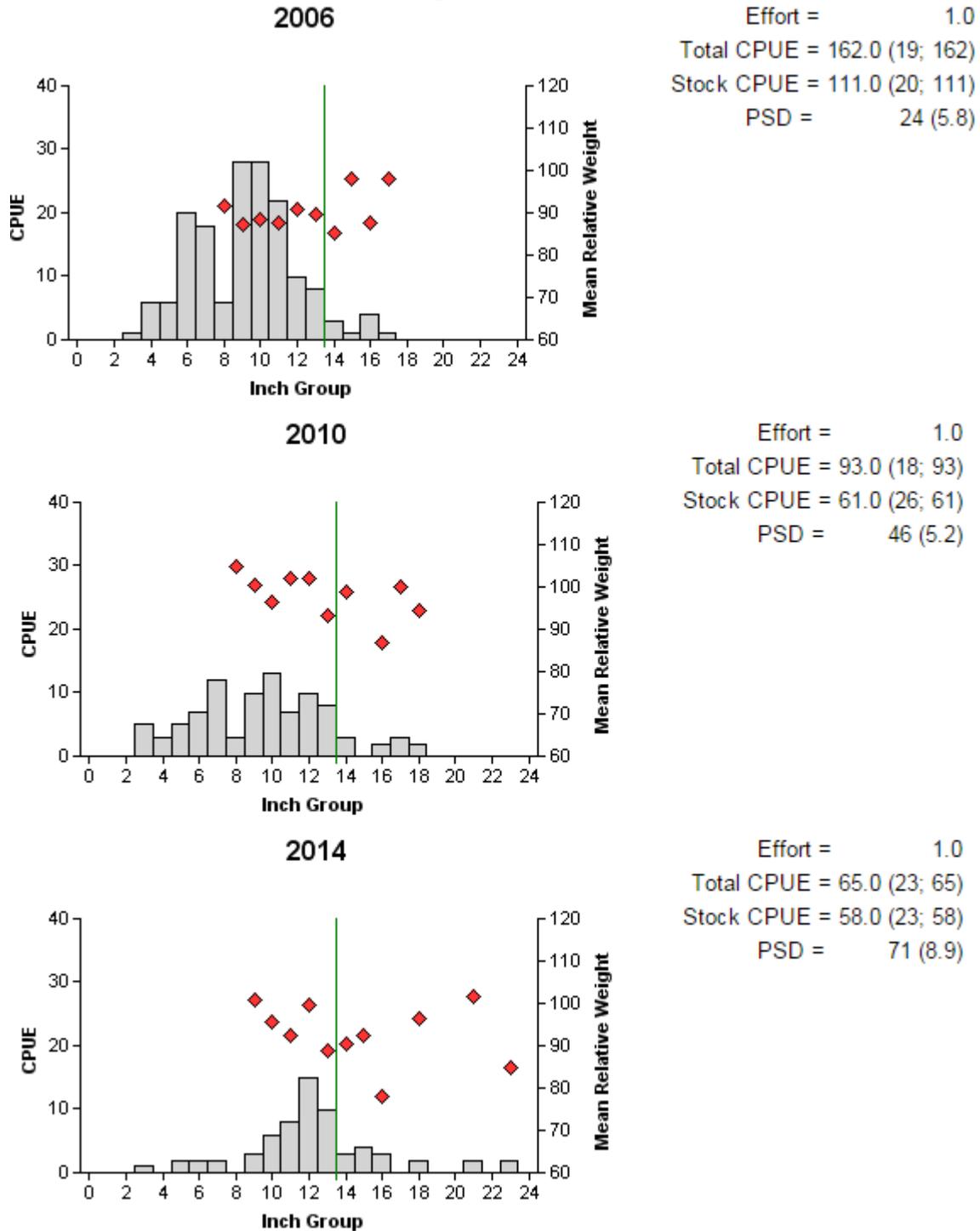
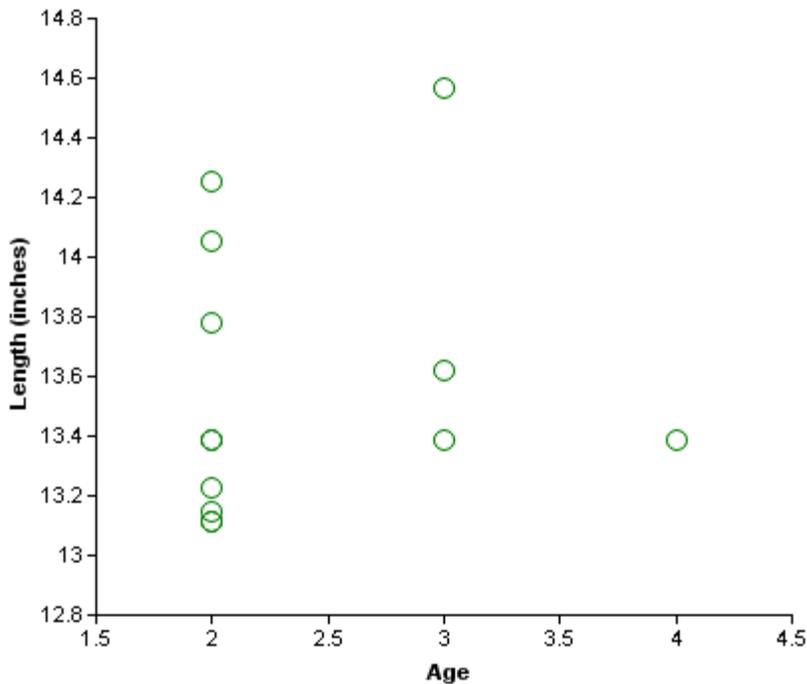


Figure 4. Number of Largemouth Bass caught per hour (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall electrofishing surveys, Mineral Wells Reservoir, Texas, 2006, 2010, and 2014. Vertical lines represent length limit at time of collection.



Average Total Length (inches)	Age	Number
13.50	2	9
13.86	3	3
13.39	4	1

Figure 5. Length at age for Largemouth Bass collected from the fall electrofishing survey at Mineral Wells Reservoir, Texas, 2014.

Table 7. Results of genetic analysis of Largemouth Bass collected by fall electrofishing, Mineral Wells Reservoir, Texas, 1988, 1998, 2002, 2006, and 2014. FLMB = Florida Largemouth Bass, NLMB = Northern Largemouth Bass, Intergrade = hybrid between a FLMB and a NLMB. Genetic composition was determined by electrophoresis prior to 2005 and with micro-satellite DNA analysis since 2005.

Year	Sample size	Number of fish			% FLMB alleles	% FLMB
		FLMB	Intergrade	NLMB		
1988	24	0	1	23	2.1	0.0
1998	40	2	19	19	26.9	5.0
2002	24	2	15	7	35.4	8.3
2006	30	0	27	3	35.0	0.0
2014	30	0	30	0	38.0	0.0

White Crappie

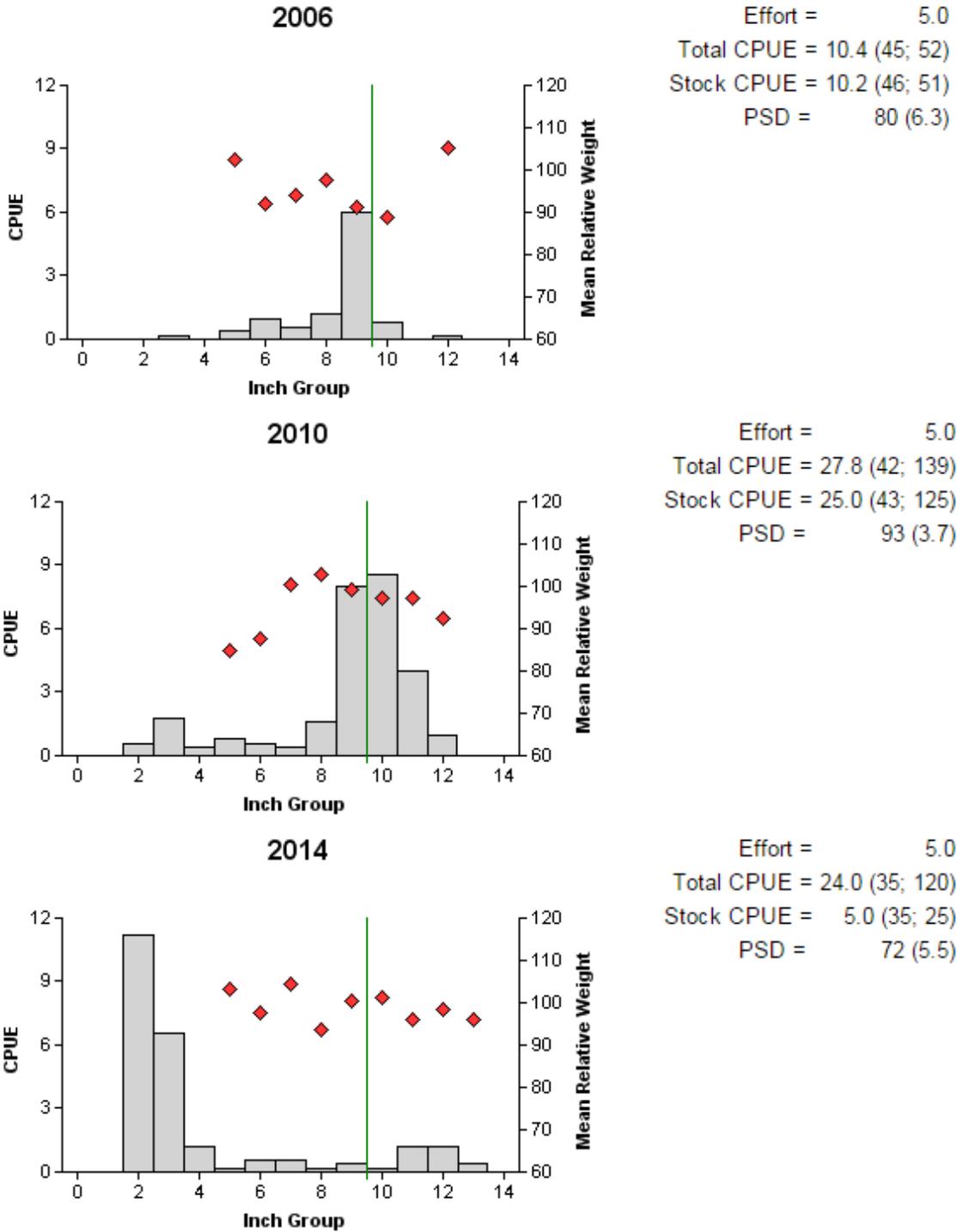


Figure 6. Number of White Crappie caught per net night (CPUE, bars), mean relative weight (diamonds), and population indices (RSE and N for CPUE and SE for size structure are in parentheses) for fall trap netting surveys, Mineral Wells Reservoir, Texas, 2006, 2010, and 2014. Vertical lines represent length limit at time of collection.

Table 8. Proposed sampling schedule for Mineral Wells Reservoir, Texas. Electrofishing and trap netting surveys are conducted in the fall, while gill netting surveys are conducted during the following spring. Standard survey denoted by S.

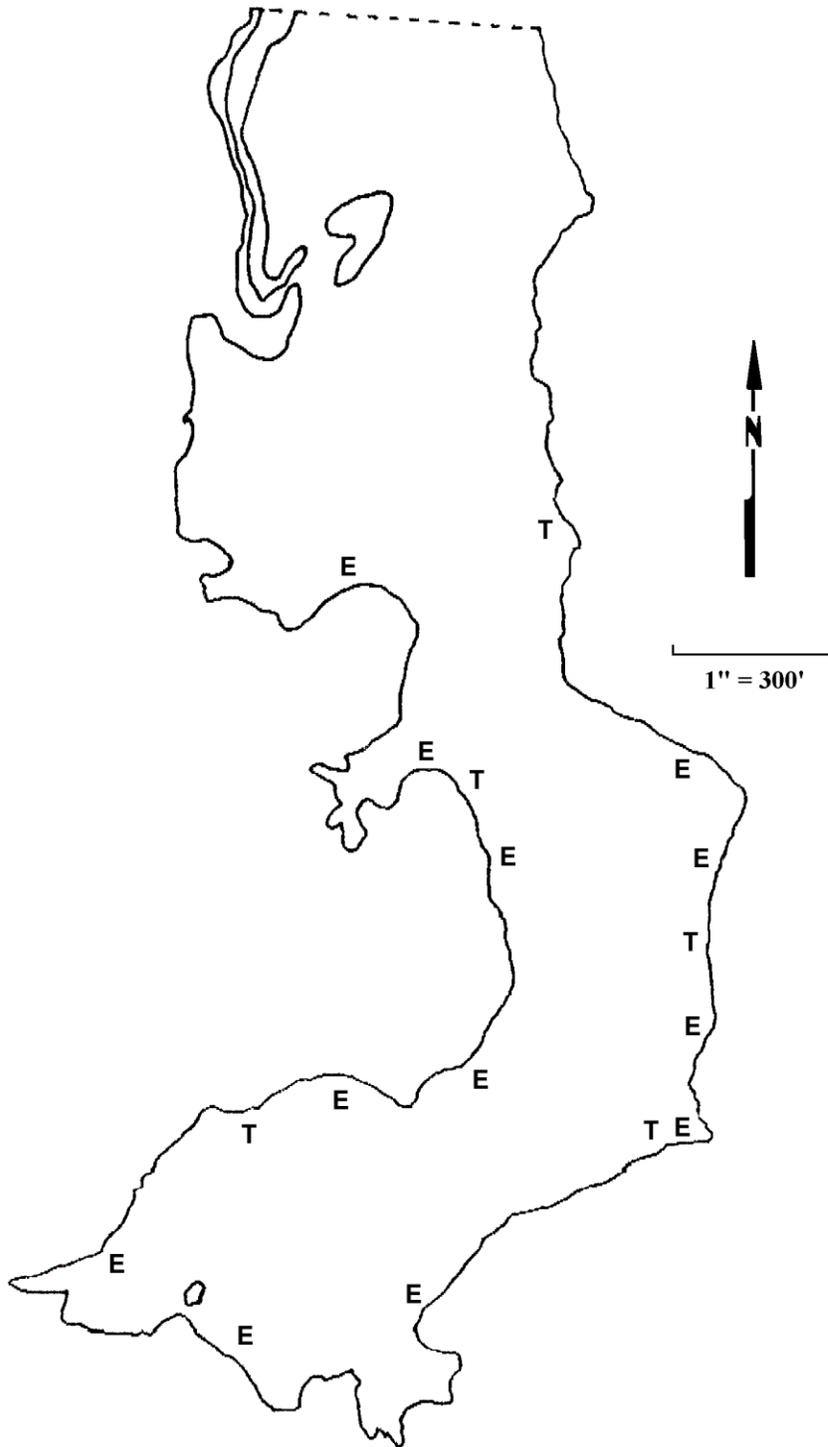
Survey year	Electrofishing Fall(Spring)	Trap net	Gill net	Habitat			Creel survey	Report
				Structural	Vegetation	Access		
2015-2016								
2016-2017								
2017-2018								
2018-2019	S	S	S		S	S		S

APPENDIX A

Number (N) and catch rate (CPUE) of all target species collected from all gear types from Mineral Wells Reservoir, Texas, 2014-2015.

Species	Trap Netting		Electrofishing	
	N	CPUE	N	CPUE
Gizzard Shad			202	202.0
Threadfin Shad			2657	2657.0
Green Sunfish			4	4.0
Warmouth			1	1.0
Bluegill			106	106.0
Longear Sunfish			58	58.0
Redear Sunfish			1	1.0
Largemouth Bass			65	65.0
White Crappie	120	24.0		

APPENDIX B



Location of sampling sites, Mineral Wells Reservoir, Texas, 2014-2015. Electrofishing and trap netting stations are indicated by E, and T, respectively. Water level was 8.2 feet below conservation for electrofishing and 8.3 feet below conservation for trap netting.

APPENDIX C

Historical catch rates of targeted species by gear type for Mineral Wells Reservoir, Texas, 1992, 1995, 1998, 2002, 2006, 2010, and 2014.

Gear	Species	Year							Avg.
		1992 _a	1995 _a	1998 _b	2002 _{b,c}	2006 _{b,c}	2010 _{b,c}	2014 _b	
Gill Netting (fish/net night)	Channel Catfish	3.8	8.8	28.6	10.8	3.6	8.6		10.7
	Flathead Catfish	0.2	0.6	0.8	0.0	0.2	0.2		0.3
Electrofishing (fish/hour)	Gizzard Shad	214.0	93.0	129.0	156.0	172.0	135.0	202.0	157.3
	Threadfin Shad	15.0	112.0	88.0	42.0	59.0	1091.0	2657.0	580.6
	Green Sunfish	0.0	12.0	42.0	17.0	26.0	8.0	4.0	15.6
	Warmouth	3.0	8.0	32.0	31.0	14.0	8.0	1.0	13.6
	Orangespotted Sunfish	0.0	0.0	3.0	1.0	0.0	2.0	0.0	0.9
	Bluegill	42.0	360.0	395.0	95.0	346.0	388.0	106.0	247.4
	Longear Sunfish	6.0	38.0	62.0	42.0	137.0	203.0	58.0	78.0
	Redear Sunfish	2.0	28.0	23.0	12.0	31.0	6.0	1.0	14.7
	Spotted Bass	2.0	0.0	6.0	9.0	2.0	0.0	0.0	2.7
Largemouth Bass	69.0	146.0	206.0	59.0	162.0	93.0	65.0	114.3	
Trap Netting (fish/net night)	White Crappie	28.1	34.5	4.3	16.8	10.4	27.8	24.0	20.8

^a All sampling stations for all gear were subjectively selected.

^b All sampling stations for all gear were randomly selected.

^c Gill netting was conducted in the spring of the following year.